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REDESCRIPTION OF THE CARDINAL FISH *APOGON ENDEKATAENIA* BLEEKER (APOGONIDAE), WITH COMMENTS ON PREVIOUS USAGE OF THE NAME

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In 1852 Pieter Bleeker described *Apogon endekataenia* from a single specimen (57 mm total length) taken at Banka in Indonesia. Subsequently, fifteen other specimens were added to the jar containing the type. According to the Auction Catalogue (Hubrecht, 1879) in which Bleeker's fish collection was offered for sale, ten specimens of *A. endekataenia* were in the A series, two specimens each in the B, C and D series and none in the E series. Whitehead *et al.* (1966: 7-14) indicate some basic procedures involved in attempting to determine which specimens are type material in the Bleeker collections. In the case of *A. endekataenia* the criteria utilized were total length and the remains of faded color pattern. Fortunately, only one specimen (55 mm total length) was close to the 57 mm length given by Bleeker. The others were of various sizes, the nearest three 45, 63 and 64 mm total length. (I cannot account for the presence of two additional specimens in the jar unless a counting or typographic error was made by Hubrecht.) The 55 mm specimen is considered to represent Bleeker's original specimen from Banka. This agrees with the opinion of M. Boeseman cited in Smith (1961).

The identification of the putative holotype fundamentally changes the concept of *Apogon endekataenia*; most past records are considered to be erroneous or doubtful identifications. The specimens subsequently added to the type jar were of

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two species and may have been the source of some errors. Descriptions in all major faunal reviews examined indicate other species, or are composites of two or more species (Bleeker, 1874, 1873-76; Weber and de Beaufort, 1929; Fowler and Bean, 1930; Smith, 1961). Lachner (1953) did not reach a decision concerning the identity of *Apogon endekataenia* but he noted that none of the specimens available to him conformed to the figure in Bleeker's Atlas (1873-76). A re-description of the species is necessary and will contribute to the eventual resolution of the dark-striped complex of species in *Apogon*.

I thank M. Boeseman, Rijksmuseum van Natuurlijke Historie (RMNH) for permission to examine Bleeker's material and for his co-operation and valuable help during my stay at Leiden. A. C. Wheeler made possible the loan of specimens at the British Museum (Natural History) (BMNH). E. A. Lachner and M. M. Smith critically read a draft of the manuscript. Funds for the taxonomic study of fishes and attending aspects were provided by the South African Council for Industrial and Scientific Research and by Rhodes University.

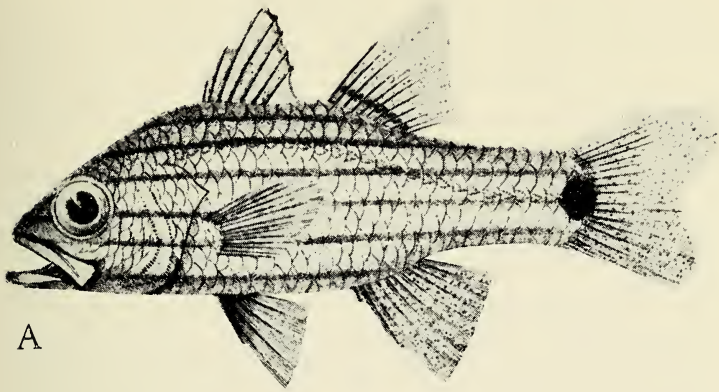
Counts and measurements were made according to Hubbs and Lagler (1958) except that the body depth was taken from the dorsal-fin origin to the pelvic-fin base. Measurements were made with dial calipers. The last dorsal ray and last anal ray, each split to its base, was counted as one element. The gillraker at the angle was included in the count for the lower arch.

Apogon endekataenia Bleeker, 1852

Figure 1

Description: For general body shape see Figure 1. Range of proportions (as percentages of standard lengths, putative holotype values in parentheses): body depth (33) 33-36; head length (36) 35-38; eye length (12) 11-12; snout length (8) 7-9; bony interorbital width (7) 6-7; upper jaw length (18) 17-18; caudal peduncle depth (14) 14-16; caudal peduncle length (25) 22-26; first dorsal spine length (4) 1-4; second dorsal spine length (12) 9-12; third dorsal spine length 19-23; fourth dorsal spine length 16-20; last dorsal spine length (17) 15-17; first anal spine length (2) 2; second anal spine length (13) 12-13; pectoral fin length (24) 23-25; pelvic fin length (21) 20-22.

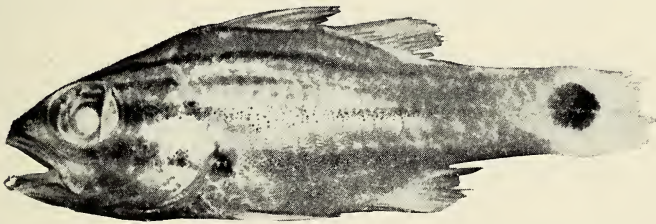
Meristic counts and ranges for nine specimens examined: dorsal fin



A



B



C

FIG. 1. A. *Apogon endekataenia*, illustration from Bleeker 1873-1876. B. *Apogon endekataenia*, putative holotype, RMNH 5593 (43.9 mm SL). C. *Apogon endekataenia*, BMNH 1892.9.2.18-20, one of three.

VII-I, 9; anal fin II, 8; pectoral fin 14; pelvic fin I, 5; well-developed gillrakers 13-15 (2-3 + 11-12), usually 13-14, including rudiments 18-21 (2-4 + 2-3; 11-12 + 2-4), putative holotype 3 + 3-12 + 3; pored lateral-line scales (25) 24-25; longitudinal scale rows above lateral line (25) 24-25; transverse scale rows above lateral line 2; transverse scale rows below lateral line (6) 6-7; median predorsal scales (3) 3-4; circumpeduncular scale rows 12 (5 + 2 + 5).

Teeth in villiform bands on premaxilla and dentary; one or two rows on vomer and palatine; none on ectopterygoid, endopterygoid or basihyal.

Vertebrae 10 + 14. Five free hypurals, one pair of slender uroneurals, three epurals, a free parhypural. Three predorsals, two spines on first dorsal pterygiophore. Seven branchiostegal rays. Basisphenoid present. Supramaxilla absent.

Life colors unknown. In 70% ethanol six dark, longitudinal stripes present from dorsal-fin base to abdomen; large round basicaudal spot slightly off center (dorsally) of lateral line (Figure 1): 1. median stripe on head splitting at dorsal fin and extending along dorsum at base of fins, fading on caudal peduncle; 2. stripe extending from snout along occiput and nape paralleling above the lateral line and reaching nearly to basicaudal spot; 3. post-ocular stripe from upper part of eye and just below lateral line extending onto caudal peduncle; 4. median stripe extending from eye above pectoral fin along side nearly to basicaudal spot; 5. stripe extending from lower part of eye and head through pectoral fin along side nearly to basicaudal spot; 6. stripe extending from lower jaw below pectoral fin along abdomen and onto last several anal-fin rays. Complete dark stripe present in basal portion of soft dorsal fin but no counterpart in soft anal fin. Peritoneum silvery, intestine black.

Distribution: Discounting the doubtful and erroneous reports, *Apogon endekataenia* is known from Borneo and Banka Island, near Sumatra, and recently I have seen material from Thailand at the California Academy of Sciences. Fowler (1937: 232-234, Fig. 23) identified two specimens from Bangkok as *Apogon robustus* (Smith and Radcliffe, 1911); however, the illustration appears similar to *A. endekataenia* but with extra stripes. It has not been reliably reported in the western Indian or central Pacific Oceans.

Material examined: Putative holotype. RMNH 5593, 43.9 mm SL, 55 mm total length, Banka Island. Other material. BMNH 1892.9.2.18-20. (3 specimens, 52.1-62.1 mm SL), Borneo, X-ray. RMNH 23966 (5, 51.5-67.6 mm SL), East Indies.

Remarks: *Apogon endekataenia* differs from other dark-striped *Apogon* (*Nectamia*) in possessing the following combination of characters: a large, round, basicaudal spot, no dark stripe in the anterior part of the anal fin, and a long post-ocular stripe. Smith (1961: 400) believed that Bleeker's illustration (1873-76: Pl. 32, fig. 2) was inaccurate. The illustration and putative holotype (Figs. 1A and B) agree better than figures by other authors of specimens purported to be *A. endekataenia*. The putative holotype also agrees with Bleeker's original description.

Of the 18 specimens examined in the Bleeker collections, five specimens in RMNH 23966 are conspecific with the putative holotype and one other specimen in RMNH 23966 was unidentifiable; two specimens in RMNH 23968 may be conspecific with the type but are too poorly preserved to be certain; and all nine in RMNH 23967 are a different species, probably *Apogon cookii* Macleay, 1881.

Smith (1961) experienced difficulty in separating closely related spe-

TABLE 1. Comparison of selected characters for three species of dark-striped *Apogon*.

Character	<i>A. taeniotrophus</i> ³		
	<i>A. endekataenia</i> ¹	<i>A. cookii</i> ²	Present
Stripe in anal fin	Absent	Present	Present
Post-ocular stripe	Present (Long)	Present (Short)	Absent
Upper and lower main stripes	Not on caudal fin	Extend onto caudal fin	Extend onto caudal fin
Midbody stripe	Not confluent with caudal spot	Confluent with caudal spot	Widens slightly at caudal base and intensified
Caudal spot	Large, slightly off center of lateral line	Small, centered on lateral line	Indistinct
Total number of gillrakers ⁴	18-21	18-19	16-19
Well-developed gillrakers ⁴	13-15	11-13	11-13
Pectoral rays	14	15	14
Body depth (% SL)	33-36	35-40	32-37
Interorbital width (% SL)	6-7	7-8	7-8

¹ Based on 9 specimens, 44-68 mm SL.² Based on 19 specimens, 43-80 mm SL.³ Based on 20 specimens, 54-85 mm SL.⁴ Includes upper and lower gillrakers of first arch.

cies in the dark-striped complex of *Apogon* and believed that he was dealing with a polychromic species. He did not see the putative holotype but did see two specimens (out of five) which are here considered conspecific with the holotype. Nevertheless, he believed these specimens were identical with his relatively fresh material. None of the material so identified at the J. L. B. Smith Institute is Bleeker's species but rather *Apogon cookii* and *Apogon taeniophorus* Regan, 1908, common species in the western Indian Ocean (see Table 1 for comparisons). The illustrations in Smith (1961) are of *A. cookii*. Both of these species also appear to be widespread in the eastern Indian and western Pacific Oceans, but have been misidentified or given junior synonyms, a problem that will be discussed elsewhere.

Weber and de Beaufort (1929) probably based their description on the collection of mixed species at RMNH although it is not so stated. Their description is insufficient to determine whether more than one species was included.

Fowler and Bean (1930) examined only the type of *A. wilsoni* (Fowler, 1918), a different species.

Some of the dark-striped, seven-spined species of *Apogon* have received varied treatment: consideration as polychromic forms of the same species (Jordan and Seale, 1906; Smith, 1961), as subspecies (McCulloch, 1915), and as different species (Radcliffe, 1911; Lachner, 1953). McCulloch's treatment would seem to be least acceptable on practical and theoretical grounds because several of these supposed subspecies are sympatric over a wide geographic range. The ideas of either a single variable species or several different species are more useful hypotheses to test at this stage. Radcliffe (1911) pointed out the changes in number of stripes in *Apogon multilineatus* (Bleeker, 1865) with growth, and it appears that stripes and the basicaudal spot may be altered with growth in other species. These changes are not described for other striped species and must be investigated.

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